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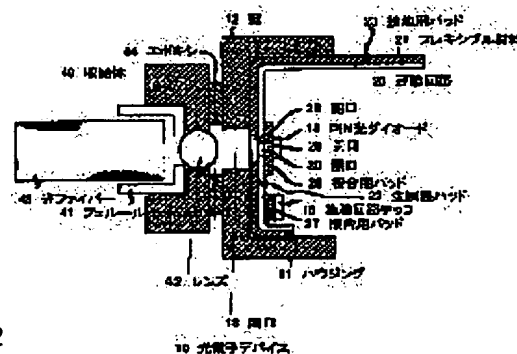
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(54) PHOTOELECTRONIC DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To achieve speedy, active matching between a photodetector and an optical fiber by accommodating a semiconductor detector in a plastic housing with the reception opening of an optical signal.

SOLUTION: A PIN photodiode 14 is mounted onto a flexible material 21 on a pad 26 for junction. An integrated circuit chip 15 for driving the PIN photodiode is mounted on another pad 27 for junction on the flexible material 21. A thin-film circuit 20 is molded into a housing 11, and hence openings 28-30 are matched to an opening 13 in a wall. A plastic accommodation body 40 formed by peniphenylene sulfide (PPS) accommodates a cylindrical optical fiber 43 being crimped or molded and is provided with a ferrule 41 for retaining at the position with an optical collector. The accommodation body 40 is provided with a lens 42 that is matched to the optical fiber 43. The optical fiber arranges the accommodation body 40 so that it touches a wall 12 at the positions of openings 28-32 and propagates light from the optical fiber that is matched to a PIN photodiode 14.



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CLAIMS

[Claim(s)]

[Claim 1] (A) The photoelectron device characterized by having the semi-conductor photodetector contained in housing which has a wall possessing opening which receives an optical signal, and the flexible film with which it is attached in housing and said photodetector is carried so that the (B) aforementioned photodetector may have consistency with opening.

[Claim 2] The device according to claim 1 characterized by having further the receipt object which is carried in said wall and contains an optical fiber.

[Claim 3] The device according to claim 2 characterized by having further the optical fiber carried in said receipt inside of the body.

[Claim 4] Said receipt object is a device according to claim 2 characterized by what is carried in said wall with epoxy.

[Claim 5] Said housing is a device according to claim 1 characterized by what is been a product made from PPS.

[Claim 6] Said flexible film is a device according to claim 1 characterized by what it has for the conductive pad connected to the touch-down potential electrical-and-electric-equipment target.

[Claim 7] It is the device according to claim 6 which said flexible film has two front faces where opening was formed there, said photodetector is carried in said main front face in order to receive the light which enters through said opening, and is characterized by what said conductive pad is formed on the opposite main front face possessing opening in a film, and another opening to adjust, and condensation of said device gathers not on a photodetector but on a pad.

[Claim 8] The device according to claim 6 characterized by what it has further for the conductive pad connected to touch-down potential in order to give protection of electromagnetic compatibility to a photodetector.

[Claim 9] The device according to claim 1 characterized by what it has further the integrated circuit chip carried in said flexible film for.

[Claim 10] Said flexible film is a device according to claim 1 characterized by what is attached in housing by impregnation mold.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the photoelectron receiver equipment packed about the photoelectron device.

[0002]

[Description of the Prior Art] The optical signal which entered using the receiver is changed into the electrical signal in a photoelectron technical field. a photodetector usually like an PIN photodiode is packed (other ICs of the optical diodes, a capacitor (capacitors), and other electronic parts like resistance (resistors)), and this receiver is independent -- it is -- it is packed combining a transmitter and the optical fiber is adjusted. This package is usually metal and/or a product made from a ceramic, and laser welding of the optical fiber is carried out to this package. Such a package's tending to become expensive and carrying out laser welding of the optical fiber is usually taking time amount.

[0003]

[Problem(s) to be Solved by the Invention] The purpose of this invention is offering the package of the low cost which can offer adjustment of high-speed activity between a photodetector and an optical fiber.

[0004]

[Means for Solving the Problem] This invention is the optical electron device which contained the semiconductor photodetector in the package made from plastics. This housing has a wall possessing opening for receiving an optical signal. A photodetector is carried in a flexible film, and this film is attached in housing, and, as a result, a photodetector is adjusted with opening. A device has the receipt object carried in the wall, in order to receive opening, the adjusted optical fiber, and an optical detector further.

[0005]

[Embodiment of the Invention] Drawing 1 and 2 show the photoelectron device of this invention. Housing made from plastics by which mold was carried out has the thin film circuit in which opening of the shape of a cylinder shown in drawing 2 was formed. This housing is thermal stability plastic material nature usually cheaper than PPS (polyphenylene sulfide), other metal, or the product made from a ceramic.

[0006] The mold of the flexible thin film circuit is carried out to housing using standard 3D impregnation mold technique. This thin film circuit has a flexible ingredient made from polyimide, and the metal is formed in both front faces. Drawing 3 and 4 show the metal pattern formed on the opposite front face of a flexible ingredient. The whole surface (drawing 4) shows the metal pad electrically connected to the pad for touch-down, and shows two or more conductive lead wire extended to the pad for junction of many items on the other hand (drawing 3) from the pad for junction on the end of a flexible circuit, and the pad for junction. Such conductive lead wire and the pad for junction are usually gold. A metal pad and the pad for junction have opening and opening, respectively, and these have consistency with opening within a flexible ingredient. This opening is designed so that the light which entered can pass through that.

[0007] With reference to drawing 1 and 2, standard PIN light diode is carried on the pad for junction of drawing 3 , and is carried on the pad for junction of drawing 3 on a flexible ingredient on a flexible ingredient, and the integrated circuit chip is carried in other pads for junction of drawing 3 on a flexible ingredient. An integrated circuit chip has the circuit which drives PIN light diode. The mold of the thin film circuit is carried out into housing, and, as a result, opening adjusts it with Kabeuchi's opening.

[0008] The receipt object made from plastics formed by PPS possesses the ferrule of the shape of sticking by pressure or a cylinder by which mold was carried out. This ferrule contains an optical fiber and holds this optical fiber in that location by the standard-illuminant study collector. (not shown

[optical collector's class]) A receipt object has an optical fiber and the adjusted lens. This optical fiber has measured the reinforcement of the signal which had consistency with PIN light diode, was made to spread the light from an optical fiber, and was generated by optical diode by arranging a receipt object so that a wall may be contacted in the location of opening. A receipt object moves in the inside of a X-Y side until desired optical reinforcement is obtained. When desired optical reinforcement is obtained, a receipt object is fixed to a wall with epoxy.

[0009] Since housing and a receipt object are the products made from plastics, the package of nearby is [the object] cheaper than the usual metal or housing made from a ceramic. A receipt object can be fixed to the location further again, without needing laser welding which can have consistency easily with an optical fiber, and time amount requires.

[0010] Carrying PIN light diode as a part of thin film circuit has an advantage further. When the pad for touch-down exists, the electromagnetic shielding of a PIN diode is obtained. The metal pad is grounded and, thereby, offers condensation shielding (condensation shield) of optical diode. That is, since the pad is grounded, while changing temperature, it can be in temperature lower than the ambient temperature. Condensation is brought together in the metal pad instead of optical diode in this way.

[0011] Above, although this invention explained PIN light diode to the example, it can pack a standard-illuminant detector by this invention. A flexible circuit can construct components, such as a capacitor and resistance, further, and, in addition to an integrated-circuit integrated circuit chip, shows still more nearly another circuit further again. Although the above explanation can consider the various modifications of this invention about one example of this invention if it is this contractor of this technical field, each of they is included by the technical range of this invention. In addition, the reference number indicated to the claim is for an easy understanding of invention, and should not be interpreted as restricting the technical range.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The perspective view of the photoelectron device by one example of this invention.

[Drawing 2] The sectional view in alignment with 2-2 of drawing 1 .

[Drawing 3] Drawing 1 , the top view of the components of the device shown in 2.

[Drawing 4] The top view of the field of the opposite direction of the components of drawing 3 .

[Description of Notations]

10 Photoelectron Device

11 Housing

12 Wall

13 Opening

14 PIN Light Diode
15 Integrated Circuit Chip
20 Thin Film Circuit
21 Flexible Ingredient
22 Metal Pad
23 Pad for Touch-down
24 Product made from Conductive Lead
25 Pad for Junction
26 Pad for Junction
27 Pad for Junction
28 Opening
29 Opening
30 Opening
40 Receipt Object
41 Ferrule
42 Lens
43 Optical Fiber
44 Epoxy

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